

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY



(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

REC'D 01 SEP 2005

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| Applicant's or agent's file reference WO 21.1244 | | FOR FURTHER ACTION See Form PCT/PEA/416 | |
| International application No. PCT/EP2004/005479 | | International filing date (day/month/year) 12.05.2004 | Priority date (day/month/year) 14.05.2003 |
| International Patent Classification (IPC) or national classification and IPC E21B33/13, C04B28/00 | | | |
| Applicant SERVICES PETROLIERS SCHLUMBERGER et al. | | | |
| <p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> sent to the applicant and to the International Bureau a total of 2 sheets, as follows:</p> <p><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p> | | | |
| <p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p> | | | |
| Date of submission of the demand 03.12.2004 | | Date of completion of this report 30.08.2005 | |
| Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465 | | Authorized Officer Zimpfer, E Telephone No. +49 89 2399-7881  | |

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/EP2004/005479

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
 - ☐ This report is based on translations from the original language into the following language, which is the language of a translation furnished for the purposes of:
 - ☐ international search (under Rules 12.3 and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

Description, Pages

1-12

as originally filed

Claims, Numbers

1-11

received on 11.07.2005 with letter of 07.07.2005

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing
3. ☐ The amendments have resulted in the cancellation of:
 - ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):
 4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
 - ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):
- * If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/EP2004/005479

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | |
|-------------------------------|-------------|------|
| Novelty (N) | Yes: Claims | 1-11 |
| | No: Claims | |
| Inventive step (IS) | Yes: Claims | 1-11 |
| | No: Claims | |
| Industrial applicability (IA) | Yes: Claims | 1-11 |
| | No: Claims | |

2. Citations and explanations (Rule 70.7):

see separate sheet

**INTERNATIONAL PRELIMINARY
REPORT ON PATENTABILITY
(SEPARATE SHEET)**

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Re Item V

**Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

Reference is made to the following documents :

- D1:** DATABASE WPI Section Ch, Week 200204 Derwent Publications Ltd., London, GB; Class A93, AN 2002-028940 XP002295616 & JP 2001 146457 A (DENKI KAGAKU KOGYO KK) 29 May 2001 (2001-05-29)
- D2:** DATABASE WPI Section Ch, Week 199209 Derwent Publications Ltd., London, GB; Class A93, AN 1992-072444 XP002296443 & ZA 9 100 876 A (SNASHALL H T) 24 December 1991 (1991-12-24)
- D3:** GB-A-2 271 350 (AMERICAN CYANAMID CO) 13 April 1994 (1994-04-13)
- D4:** WO 01/74967 A (HEYING THEODORE L) 11 October 2001 (2001-10-11)
- D5:** EP-A-0 530 768 (HOECHST AG) 10 March 1993 (1993-03-10)
- D6:** US-A-4 664 816 (WALKER CLARENCE O) 12 May 1987 (1987-05-12)

1. Amendments:

- 1.1** The amendments filed with the letter dated 07.07.2005 are allowable considering Article 19(2) PCT.

2. Novelty :

- 2.1** Since none of the documents cited in the search report disclose all the features of independent **claim 1**, it is considered that said claim as well as dependent claims 2-11 are novel over said prior art documents.

3. Inventive step :

- 3.1** Document **D1** discloses a cement composition used in the field of construction and engineering works, comprising cement, water, a super-absorbent polymer and a alkali metal aluminate (salt).

Document **D2** discloses a cementitious mixture comprising cement, water, a super-absorbent polymer (from 0,05 to 0,2 wt%), which can be added before the water (i.e. dry-

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blended).

As justified by the applicant, this kind of cement admixture seems not suitable for underground wellbore applications (pumpable slurry), and none of these documents disclose the fact that the material is susceptible to swell in contact with underground water in case of failure in the cement matrix.

Since none of the prior art document teaches or fairly suggests this specific technical features, it appears to be non-obvious to the skilled person.

Hence, claim 1, as well as dependent claims 2-11, are considered as being inventive.

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Claims

1. A composition for well cementing comprising:
 - a pumpable slurry of cement,
 - water and
 - a material having residual water-absorption properties after the setting of the cement, so that said material is susceptible to swell in contact with underground water in case of failure of the cement matrix.
2. The composition of claim 1, wherein said material is a super-absorbent polymer.
3. The cement system of claim 1, wherein the super-absorbent polymer is selected from the list consisting of polymethacrylate and polyacrylamide or a non-soluble acrylic polymers.
4. The cement system according to any of claims 2 to 3, wherein the super-absorbent polymer is added to the slurry dry-blended with the cement.
5. The cement system according to any of claims 2 to 4, wherein the super-absorbent polymer is added at a concentration between 0.05% and 3.2% by weight of cement..
6. The cement system according to claims 2 to 5 further comprising a salt.
7. The cement system of claim 6, wherein said salt is sodium chloride or calcium chloride.
8. The cement slurry according to claims 2 to 7, wherein the super-absorbent polymer is added under the form of particles ranging from 10 to 1500 μ .
9. The cement system according to any of the preceding claims, whereby the material is provided in a capsule that releases the material in response to exposure of the cement to at least one downhole parameter.

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10. The cement system according to any of claims 1 to 9, whereby the material is provided in a capsule that releases the material when the cement matrix cracks.
11. The cement system according to any of the preceding claims further comprising at least one additive selected from the list consisting of dispersing agent, fluid loss control agent, set retarder, set accelerator and anti-foaming agent.